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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

COUNTERGIRL (hotel & rest.) 2-27.13
COUNTERMAN, LUNCHROOM OR COFFEE SHOP (hotel & rest.) 2-27.13

B-430 or S-164

TM 001 165

U. S. Employment Service in
Cooperation with
Ohio State Employment Service

U. S. DEPARTMENT OF LABOR
Bureau of Employment Security
Washington 25, D. C.

July 1960

GATB #2259
March 1959

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

COUNTERGIRL (hotel & rest.) 2-27.13
COUNTERMAN, LUNCHROOM OR COFFEE SHOP (hotel & rest.) 2-27.13

B-430 or S-164

Summary

The General Aptitude Test Battery, B-1002A, was administered to a sample of 50 workers (6 men and 44 women) employed as Countergirl 2-27.13 and Counterman, Lunchroom or Coffee Shop 2-27.13 by the White Castle System, Incorporated in Columbus, Ohio. The criterion consisted of rank order supervisory ratings. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes P-Form Perception, K-Motor Coordination, F-Finger Dexterity, and M-Manual Dexterity were selected for inclusion in the test norms.

GATB Norms for Countergirl (hotel & rest.) 2-27.13, Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13 - B-430 or S-164

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Countergirl 2-27.13 and Counterman, Lunchroom or Coffee Shop 2-27.13.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-430 or S-164

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
P	CB-1-A CB-1-L	85	P	Part 5 Part 7	85
T	CB-1-G CB-1-K	70	K	Part 8	75
F	CB-1-O CB-1-P	80	F	Part 11 Part 12	75
M	CB-1-M CB-1-N	75	M	Part 9 Part 10	75

Effectiveness of Norms

The data in Table IV indicate that 12 of the 16 poor workers, or 75 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 75 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 27 of the 31 workers who made qualifying test scores, or 87 percent, were good workers.

TECHNICAL REPORT

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Countergirl (hotel & rest.) 2-27.13 and Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13.

II. Sample

The GATB, B-1002A, was administered during the period September 1958 to March 1959 to a sample of 65 (6 men and 59 women) employed as Countergirl (hotel & rest.) 2-27.13 and Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13 by the White Castle System, Incorporated in Columbus, Ohio. All the individuals employed as Countergirl at the company were tested. Of the 65 workers tested, 15 women were eliminated from the sample either because they were supervisors and their job duties were not the same as the Countergirls or because they terminated their employment before they had gained the minimum amount of experience needed for the job. Thus, the final sample consisted of 50 workers (6 men and 44 women).

Three weeks was considered the minimum training period. This was determined by the length of the time it takes for the worker to learn the basic fundamentals of each task to be performed. The age limits for hiring are 18 to 35 years. The company prefers applicants with at least a high school education and with no previous experience as Countergirl or Counterman.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations with the criterion for age, education, and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

Countergirl (hotel & rest.) 2-27.13
Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13

N = 50

	M	σ	Range	M
Age (years)	30.0	10.1	18 - 54	.091
Education (years)	9.8	1.6	7 - 12	.162
Experience (months)	48.0	49.1	4 -156	.089

There are no significant correlations between age, education, or experience and the criterion. The data indicate that this sample is suitable for test development purposes with respect to age, education, and experience.

III. Job Description

Job Title: Countergirl (hotel & rest.) 2-27.13
Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13

Job Summary: Greets customer and takes order. Serves order to customer. Collects amount due or punches price on food check. Unpacks meat, buns, and other packaged foodstuffs for griddle supply. Prepares and cooks sandwiches for counter service and carry out orders. May perform various other duties, such as refilling depleted stock, cutting pies and cakes, making coffee and dispensing beverages, cleaning counters, and washing dishes.

Work Performed: Takes customers' orders; serves food; mentally computes customers' bills; takes money; operates cash register and makes change. Makes and serves coffee; dispenses milk, orange, cola, and malt drinks. Plates pies and donuts and arranges in display case. Keeps all food and equipment dispensers, such as mustard containers and paper cup dispensers filled at all times. Washes dishes.

Prepares and fries hamburgers: Unpacks meat, buns, pickles, and onions for griddle supply. Covers entire surface of griddle with thin layer of chopped onions; breaks open package of frozen meat patties; separates frozen meat patties; using both hands simultaneously places 25 to 50 meat patties on onions; separates top and bottom halves of buns; using both hands simultaneously places top and bottom halves of buns on top of each meat patty; adjusts heat control for proper cooking. Inserts hamburger-turner between griddle surface and onions; lifts onions, hamburger and bun; with left hand removes bottom half of bun and places against bottom side of hamburger-turner; withdraws hamburger-turner from between onions and bottom half of bun. Places completed sandwich on side-board; adds pickle and places on plate for counter service.

Packs carry-out orders: Picks up flattened cardboard container with left hand; applies pressure with left hand to open container; closes flaps on bottom of container with right hand; places prepared hamburger in container in container and sacks order.

Refills depleted stock at end of work shift; cleans all equipment and work areas. Participates with other countergirls in general clean-up work such as sweeping, mopping, washing walls and windows

IV. Experimental Battery

All the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consisted of rank order supervisory ratings. The supervisor and assistant supervisor made independent rank order ratings on the basis of each employee's overall work performance considering the following: (1) speed of preparing sandwiches, (2) ability to compute customers' bills and to make change, (3) ability to perform other duties such as, plate pies and donuts, dispense and serve drinks, and handle equipment. Every effort was made to minimize the influence of such factors as salesmanship, cooperation, and courtesy on the ratings.

The decision to use rank order ratings was made after several attempts with other types of criteria proved unsuccessful because of the inability of the raters to differentiate between the workers. The rank order ratings were converted to linear scores and a Pearson product-moment correlation between the two ratings was computed. A correlation coefficient of .85 was obtained. On this basis, an average of the two ratings was used as the final criterion for validation purposes.

VI. Statistical and Qualitative Analyses

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general working population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (o), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

Countergirl (hotel & rest.) 2-27.13
Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13

N = 50

Aptitudes	M	o	r
G-Intelligence	86.2	12.7	.198
V-Verbal Aptitude	87.3	13.0	.336*
N-Numerical Aptitude	85.2	16.7	.180
S-Spatial Aptitude	89.9	14.1	-.096
P-Form Perception	93.8	14.6	.322*
Q-Clerical Perception	91.9	13.4	.404**
K-Motor Coordination	94.9#	17.9	.489**
F-Finger Dexterity	99.8#	18.5	.128
M-Manual Dexterity	95.2#	21.5	.307*

**Significant at the .01 level
*Significant at the .05 level
#Relatively High Mean Score

The highest mean scores in descending order of magnitude were obtained for Aptitudes F, M, and K, respectively. All the aptitudes, except Aptitude M have standard deviations of less than 20. Aptitude V has the lowest standard deviation.

For a sample of 50 cases, correlations of .361 and .279 are significant at the .01 level and the .05 level of confidence, respectively. Aptitudes Q and K correlate significantly with the criterion at the .01 level. Aptitudes V, P, and M correlate significantly with the criterion at the .05 level.

B. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Numerical Aptitude (N) - required to compute customers' bills and make change.

Motor Coordination (K), Finger Dexterity (F), and Manual Dexterity (M) - required to handle meat patties and buns and place them on griddle; to assemble sandwiches accurately and quickly; to serve food to customers; to dispense and serve beverages; and to perform general clean-up tasks.

C. Selection of Test Norms:

Based on the quantitative and qualitative evidence cited above, Aptitudes P, K, F, and M warranted further consideration for inclusion in the test norms. The evidence for each of these aptitudes is indicated below.

Aptitude	Relatively High Mean Score	Significant Correlation with the Criterion	Importance Indicated by Qualitative Analysis
P		X	
K	X	X	X
F	X		X
M	X	X	X

Although Aptitudes V and Q showed significant correlations with the criterion, they were eliminated from further consideration for inclusion in the norms on the basis of the qualitative analysis.

Various combinations of Aptitudes P, K, F and M, with appropriate cutting scores were selected as trial norms. The relationship between each set of trial norms and the criterion (dichotomized as indicated in section VII) was determined.

A comparison of the results showed that B-1002 norms consisting of P-85, K-75, F-75, and M-75 had the best selective efficiency.

In test development studies an attempt is made to develop a set of norms such that the cutting score for each aptitude included in the norms will be set at a five-point score level close to one standard deviation below the aptitude mean of the experimental sample. Adjustments of cutting scores from one standard deviation below the mean are made to effect better selective efficiency of the norms. In this study the aptitude cutting scores are each within 6 points of one standard deviation below the aptitude mean of the sample.

VII. Concurrent Validity of Norms

For the purpose of computing the tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test, the criterion was dichotomized by placing approximately one-third of the sample in the low criterion group. This was accomplished by setting a criterion critical score of 42 which resulted in 16 of the 50 workers, or 32 percent of the sample, being placed in the low criterion group.

Table IV shows the relationship between test norms consisting of Aptitudes P, K, F, and M with critical scores of 85, 75, 75, and 75, respectively, and the dichotomized criterion for Countergirl (hotel & rest.) 2-27.13 and Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Relationship between Test Norms Consisting of Aptitudes P, K, F, and M with Critical Scores of 85, 75, 75, and 75, Respectively, and the Criterion for Countergirl (hotel & rest.) 2-27.13
and
Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13

N = 50

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	7	27	34
Poor Workers	12	4	16
Total	19	31	50

$r_{tet} = .76$ $\quad X^2 = 11.460$

$\sigma_{r_{tet}} = .23$ $\quad P/2 < .0005$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of mean scores, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes P, K, F, and M with minimum scores of 85, 75, 75, and 75, respectively, are established as B-1002 norms for the occupation of Countergirl (hotel & rest.) 2-27.13 and Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13. The equivalent B-1001 norms consist of P-85, T-70, F-80, and M-75.

IX. Determination of Occupational Aptitude Pattern

When the specific test norms for an occupation include four aptitudes, only those occupational aptitude patterns which include three of those four aptitudes with cutting scores that are within 10 points of the cutting scores established for the specific norms are considered for that occupation. Three of the existing 23 occupational aptitude patterns meet these criteria for this study. These occupational aptitude patterns and their B-1002 norms are OAP-15, P-85, K-80, M-80, OAP-16, P-75, F-80, M-80, and OAP-17, K-85, F-80, M-80. The selective efficiency of each of these OAP's for this sample was determined by means of the tetrachoric correlation technique. A significant relationship was obtained between OAP-15 and OAP-17 and the dichotomized criterion. OAP-15 and OAP-17 screened out a proportion of the sample that was within the required range of .10 to .60. However, the highest tetrachoric correlation, .54 with a standard of .22 was obtained for OAP-15. The proportion of the sample screened out by OAP-15 was .44. Therefore, it is recommended that OAP-15 be used in counseling for the occupation of Countergirl (hotel & rest.) 2-27.13 and Counterman, Lunchroom or Coffee Shop (hotel & rest.) 2-27.13.